

1.) What are the two main activities of inferential statistics?

- 1.) Use confidence intervals to estimate a population parameter.
- 2.) Conduct a hypothesis test to test a claim about a population.

2.) What is the purpose or goal of conducting a hypothesis test?

To Reach a conclusion to either Reject H_0 or Fail to Reject H_0 .

3.) What is the difference between the Null hypothesis and the Alternative hypothesis?

We always assume that H_0 is true and it is a statement that the value of a population parameter is equal to a claimed value \rightarrow the Alternative is our research question \rightarrow the statement that the parameter somehow differs from the null hypothesis.

Examine each of the following statements and express the Null hypothesis and Alternative hypothesis in symbolic form.

4.) More than 40% of the senior class went to Mexico for spring break.

claim: $p >$ $H_0: p = 0.40$ $H_A: p > 0.40$

5.) Most kissing couples turn their heads to the right.

claim: $p >$ $H_0: p = 0.50$ $H_A: p > 0.50$

6.) The mean number of tardies for students in the senior class is equal to 8.

claim: $\mu =$ $H_0: \mu = 8$ $H_A: \mu \neq 8$

7.) The mean ACT score for Totino-Grace high school is no more than 29.

claim: $\mu \leq$ $H_0: \mu = 29$ $H_A: \mu > 29$

8.) The percentage of senior parents who will come to conferences this spring is less than 35%.

claim: $p <$ $H_0: p = 0.35$ $H_A: p < 0.35$

9.) The average cost of a high school prom is at least \$12,000.

claim: $p \geq$ $H_0: p = 12,000$ $H_A: p < 12,000$

10.) What does it mean to "Reject" the Null hypothesis?

We are supporting the Alternative

11.) What does it mean when we "Fail to Reject" the Null hypothesis?

We do not have strong enough evidence to reject it.

12.) Why do we use the phrase "Fail to Reject" instead of "Accept"?

Because we have not proved the Null, only we do not have strong enough evidence against it.

13.) What does a critical region represent? All values that cause us to reject the null hypothesis → these values are "unusual" and are therefore considered "significant."

In each of the following problems complete a full hypothesis test (Steps 1 – 5):

13.) The director of water safety in Hawaii claims that the proportion of drowning deaths of children attributable to beaches is more than 0.25, a researcher decided to test this claim by looking at sample statistics that include 615 drowning deaths of children with 30% of them attributable to beaches. Test this researchers claim with a significance level of 0.01.

$$n = 615$$

$$\hat{p} = .30$$

$$p = 0.25$$

$$q = 0.75$$

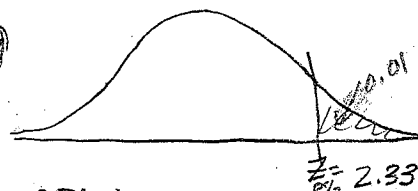
$$\textcircled{\#1} H_0: p = 0.25$$

$$H_A: p > 0.25$$

$$\textcircled{\#2} \alpha = 0.01$$

$$\textcircled{\#3} Z = \frac{.30 - .25}{\sqrt{(.25)(.75)}/615} = 2.86$$

$\textcircled{\#4}$



$\textcircled{\#5}$ 2.86 is in Critical Region so
Reject H_0

14.) Body Fat Bust claims that the proportion of people who lose 10 pounds in one month on their program is at least 60%. A sample of 40 customers using Body Fat Bust showed that 20 people lost 10 pounds in one month. Based on this sample, can Body Fat Bust support their claim? Use a 0.05 significance level.

$$n = 40$$

$$\hat{p} = 20/40 = .5$$

$$p = 0.60$$

$$q = 0.40$$

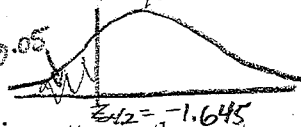
$$\textcircled{\#1} H_0: p = 0.60$$

$$H_A: p < 0.60$$

$$\textcircled{\#2} \alpha = 0.05$$

$$\textcircled{\#3} Z = \frac{.5 - .6}{\sqrt{(.6)(.4)}/40} = -1.29$$

$\textcircled{\#4}$



$\textcircled{\#5}$ -1.29 is not in Region so

Fail to Reject H_0

15.) A researcher believes that 25% of adults have smoked cigarettes in the past week. In a Gallop poll of 1018 adults, it was found that 22% smoked cigarettes in the past week. Use a 0.05 significance level to test the researchers claim.

$$n = 1018$$

$$\hat{p} = .22$$

$$p = .25$$

$$q = .75$$

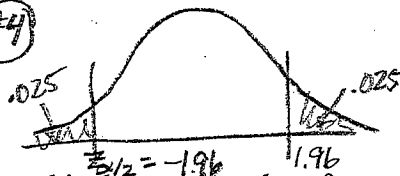
$$\textcircled{\#1} H_0: p = .25$$

$$H_A: p \neq .25$$

$$\textcircled{\#2} \alpha = 0.05$$

$$\textcircled{\#3} Z = \frac{.22 - .25}{\sqrt{(.25)(.75)}/1018} = -2.21$$

$\textcircled{\#4}$



$\textcircled{\#5}$ -2.21 is in Region so

Reject H_0

16.) A person claims to have extra sensory powers. A card is drawn at random from a deck of cards and without looking at the card, the person is asked to identify the suit of the card. He correctly identifies the suit 28 times out of 100. Can you support this person's claim? Use a significance level of 0.10.

$$n = 100$$

$$p = 28/100 = .28$$

$$p = .5$$

$$q = .5$$

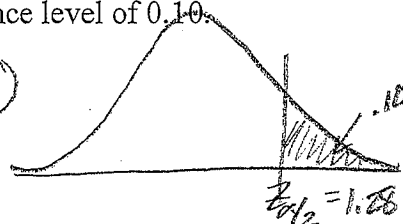
$$\textcircled{\#1} H_0: p = .5$$

$$H_A: p > .5$$

$$\textcircled{\#2} \alpha = 0.10$$

$$\textcircled{\#3} Z = \frac{.28 - .5}{\sqrt{(.5)(.5)}/100} = -4.4$$

$\textcircled{\#4}$



$\textcircled{\#5}$ -4.4 is not in the Region
So **Fail to Reject H_0**